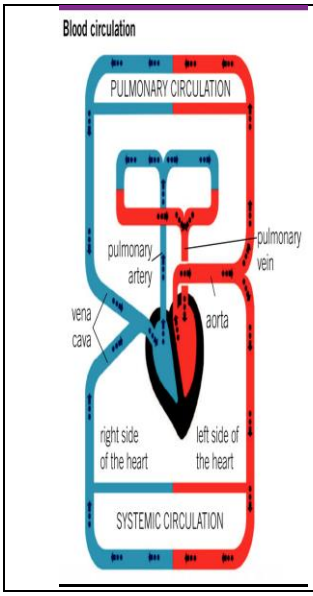
Science - Animals, including Humans

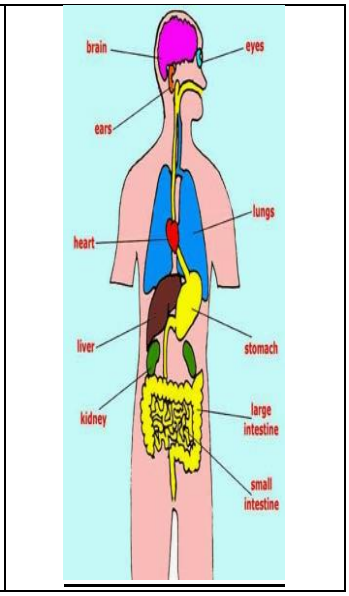
Topic Overview

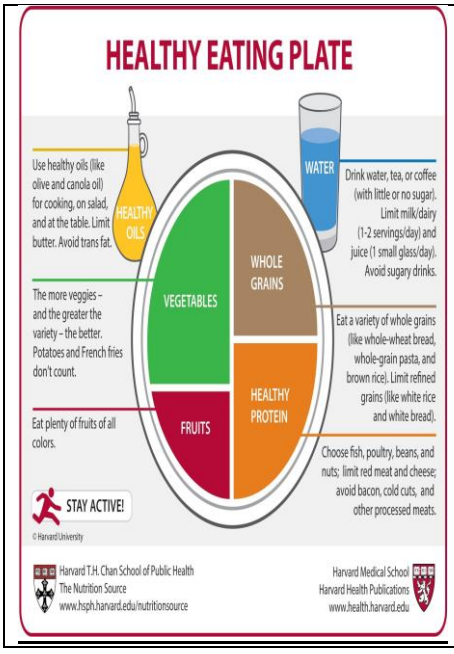
In this topic, we will study the lifecycle of a human and focus on the human body, identifying major organs and how they function. We will look at the heart and how it pumps essential oxygen and blood around the body. We will investigate the respiratory system and focus on how nutrients are transported within the body. The positive effects of exercise for good health and the effects of tobacco, alcohol and drugs on the body will conclude the topic.

Key Vocabulary

Word	Definition
Circulatory system	How your heart pumps blood and oxygen around the body.
Respiratory system	How our lungs inflate/deflate to help us breathe in oxygen and breathe carbo dioxide out.
Digestive System	How we break down and digest food, taking nutrients but getting rid of un-needed waste.
Veins	These carry deoxygenated blood back to the heart.
Arteries	These carry oxygenated blood from the heart to the lungs.
Capillaries	The smallest vessel transporting blood.
Organ	A major body part e.g. heart, lungs, brain.
Pulse	This is your heartbeat, created by your heart pumping repeatedly around the body.







Key Knowledge – Science

- Identify the main stages of the human life cycle.
- Know the heart acts as a pump to circulate the blood through vessels around the body, including through the lungs.
- Know the effects on the human body of tobacco, alcohol and other drugs and how these relate to their personal health.
- Know the importance of exercise for good health.
- Describe the ways in which nutrients and water are transported.
- Research scientist research and work of Marie Maynard Daly.

Key Vocabulary

Word	Definition
Diet	The type of food people eat.
Healthy	A good physical and mental condition.
Nutrition	Obtaining the food/vitamins necessary for health & growth
Obese	Overweight with a lot of body fat and mass.
Underweight	Not at a healthy weight for age, height, body.
Drugs	A medicine or substance that has an effect on the body.
Tobacco	A product usually smoked that contains chemicals that affects the body and is highly addictive.
Nicotine	A poisonous chemical found in tobacco.
Alcohol	A liquid that changes behaviour and affects internal organs.
Side effects	Unwanted feeling or symptoms.
Prescribed	Advised or authorised to use/take.
Addictive	Need to keep repeating something.
Recreational	Doing something for enjoyment

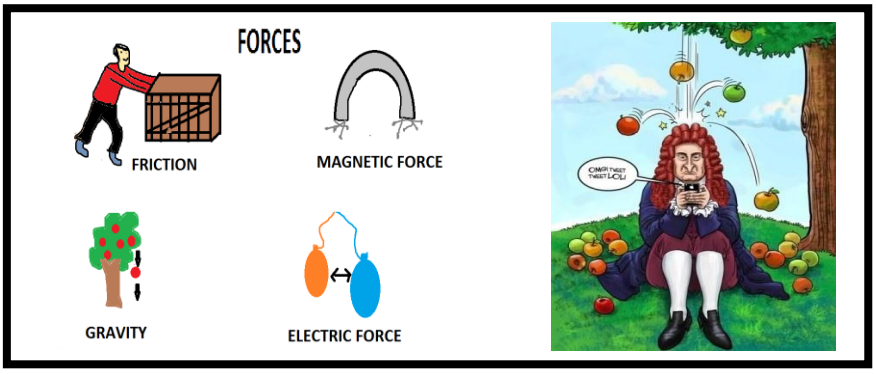
Science - Forces

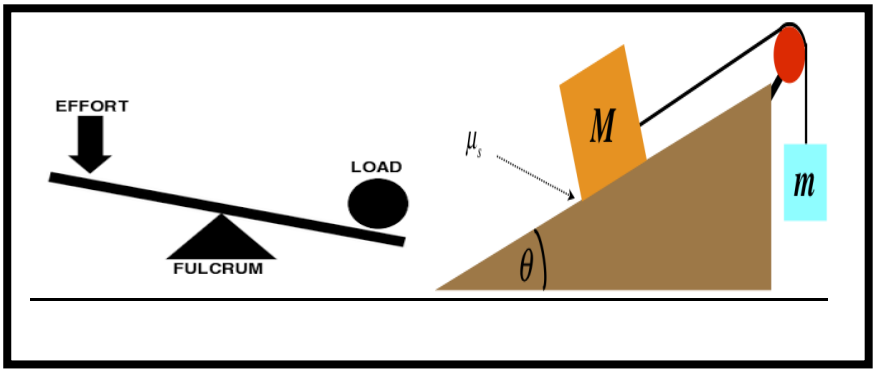
Topic Overview

In this topic, we will study forces – know there are different types of forces and these impact on objects and movement. Identify how pulleys and levers allow a smaller force to have a greater effect. Research the lives and work of Galileo Galilei and Isacc Newton.

Key Knowledge – Science

- Know that there are different types of forces (push, pull, friction, air resistance, water resistance, magnetic forces, gravity).
- Identify objects that need friction and objects that need friction reduced. Explore, identify and describe areas of friction on a bike. Be able to say how friction keeps us safe.
- Carry out some simple friction experiments and activities.
- Imagine what would happen if friction in the world was reduced to nothing.
- Know that objects are attracted to the Earth because of the force of gravity acting between the Earth and the falling object.
- Know that gravity can act without direct contact between the Earth and an object.
- Know about air resistance affecting the fall of an object. Including in a vacuum and on the moon.
- Give examples of air resistance being useful or a hindrance.
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
- Investigate the effects of different mechanisms.
- Be able to say that friction, air resistance and water resistance are forces which slow down moving objects.
- Give example of ways that friction, air resistance and water resistance can be useful or unwanted.
- Give simple ways that friction, air resistance and water resistance can be reduced.
- Know that more than one force can act on an object simultaneously.
- Research the impact that Galileo Galilei and Isaac Newton had on our understanding of forces.
- Be able to give some simple mechanisms that are useful in daily life.





Key Vocabulary

Word	Definition
Force	A pushing or pulling effect that something has on something else.
Gravity	Really large objects (stars, planets and moons) attract other objects.
Mass	How much 'stuff' there is in an object.
Weight	The measure of the force of gravity on an object.
Friction	Resistance to motion when one object rubs against another
Resistance	Going against something
Aerodynamics	Having a thin, pointy shape to reduce drag.
Streamlined	Having a thin, pointy shape to reduce drag
Upthrust	A force that pushes up, usually in water
Buoyancy	Whether an object floats or sinks depends on its buoyancy
Lever	A basic tool to lift heavy things or open things
Pulley	A wheel with a groove that makes it easier to lift heavy things
Gear	Part of a machine with teeth that lock with teeth on another part to make it move.

Science - Electricity

Topic Overview

In this topic, we will study electricity – where we get it from, create simple circuits using a range of components and learn how to draw and represent components in circuit diagrams. We will look at series and parallel circuits and how lights can be made dimmer or brighter.

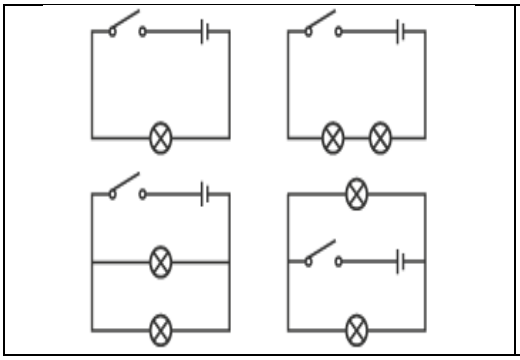
Key Knowledge – Science

Understand where electricity comes from and dangers of it.

Identify common components in an electrical circuit including a switch, cables, batteries, bulbs, buzzers, motors and their electrical symbols.

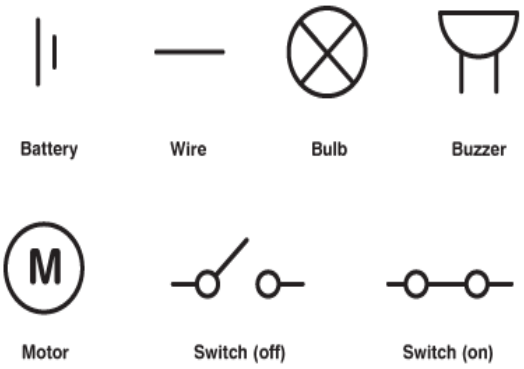
Plan and draw series and parallel circuits using symbols

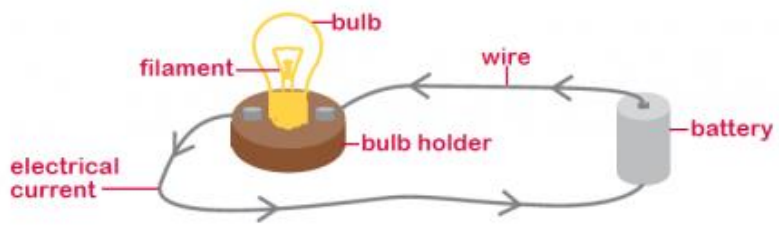
Test different circuits and analyse them making bulbs brighter or dimmer.



Circuit Diagrams

Straight lines to show wires
Symbols in place of drawings
Series circuit
Parallel circuit – lights/buzzers operate independently of each other.





Key Vocabulary

Word	Definition
Battery	A container consisting of one or more cells where chemical energy is converted into electricity and used as a source of power
Bulb	A glass bulb which provides light by passing an electrical current through a filament
Buzzer	An electrical device that makes a buzzing noise and is used for signalling
Cell	A device containing electrodes that is used for generating current
Circuit	A complete and closed path around which a circulating electric current can flow
Switch	A device for making and breaking the connection in an electric circuit
Motor	A machine powered by electricity that supplies motive power for a vehicle or other moveable device
Resistor	A component that limits the flow of electricity
Conductor	A material or device which allows heat or electricity to carry through
Current	A flow of electricity which results from the ordered directional movement of electrically charged particles
Electricity	A form of energy resulting from the existence of charged particles
Filament	A conducting wire or thread with a high melting point that forms part of an electric bulb
Component	A piece of electrical equipment used in a circuit like a witch or a bulb
Insulator	A material that does not let electricity pass through it
Mains electricity	Where we get electricity from via plugs and sockets

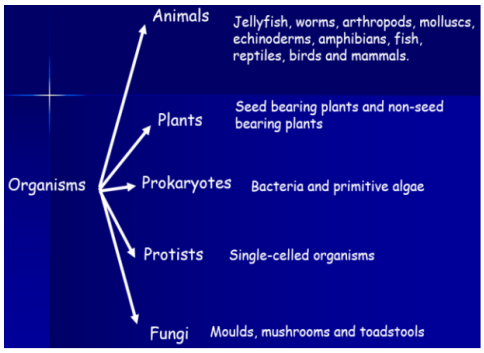
Science - All Living Things

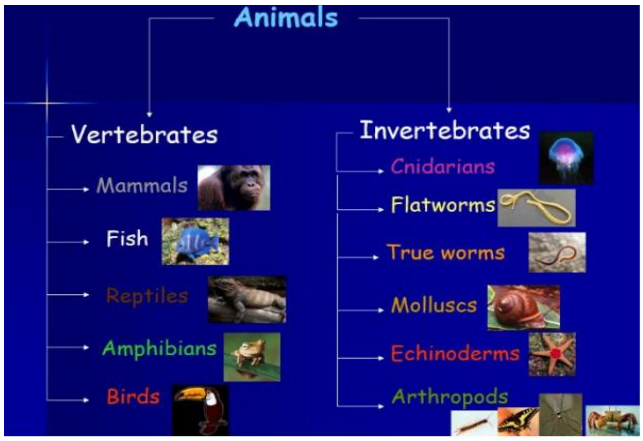
Topic Overview

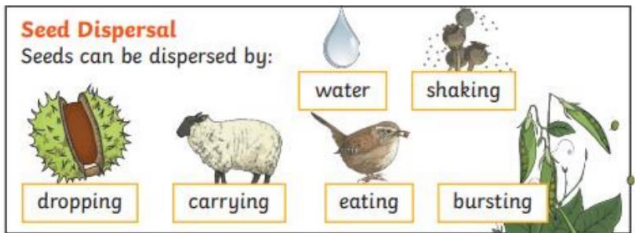
In this topic, we will study how living things are classified into broad groups, according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals.
Classifications by characteristics will be explained.
Explain the life cycles of a mammal, am amphibian, am insect and a bird.
Describe the life process of reproduction in some animals and plants.

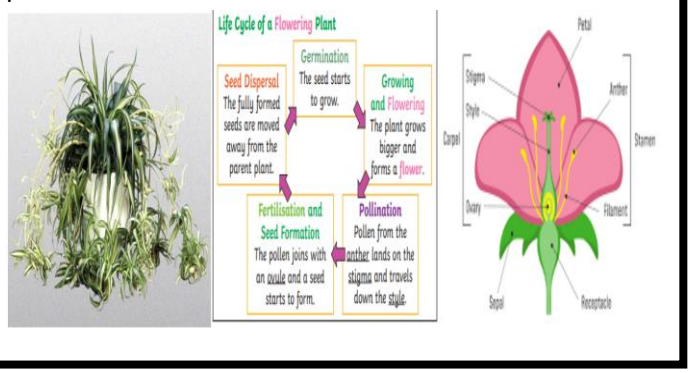
Key Knowledge – Science

- Understand the 7 life processes that all living things do.
- Learn how classification of living things developed over time.
- Use diagrams to classify accurately
- Understand different types of micro-organisms.
- Describe the life cycle of plants and mammals.
- Identify parts of a plant
- Know hoe some plants disperse their seeds









Key Vocabulary

Word	Definition
Micro-organisms	A microscopic life from like a bacteria or a virus
Vertebrates	A living creature with a backbone
Invertebrates	A living creature without a backbone
Amphibians	Animals that are cold blooded, lay eggs in water and have moist skin
Reptiles	Animals that lay eggs, have dry or scaly skin and are cold blooded
Mammals	A type of animal that has a backbone and hair
Protists	Tiny, single cleed organisms
Prokaryotes	Tiny micro-organisms like bacteria and algae
Fungi	A micro-organism like mould, mushrooms and toadstools
Flower	Designed to attract bees and insects to allow pollination
Nectar	A sugary fluid produced within flowers to encourage pollination by insects
Reproduce	To create a copy of something
Pollination	Wind blows pollen onto other plans tot trees. Insects collect pollen and take to other flowers
Pollinator	Insects and animals that carry pollen from one plant to another
Petal	Attract insects and provides a landing pad
Sepal	Holds up the petals
Stamen	Male part of the flower. Made up of the anther and filament
Anther	Produces the pollen
Pollen	Make pollen needs to meet female ovule (egge0 to produce a seed
Filament	Holds up the anther
Carpel	The female part of the flower. Made up of the stigma, style and ovary
Stigma	Pollen needs to get onto the stigma
Style	Pollen travels down the style from the stigma
Ovary	Holds to ovule (egg). If pollen meets the egg, the seed starts to grow here
Ovule (egg)	The female egg need to meet the male pollen
Fertilisation	The pollen and egg coming together to mate.
Seed dispersal	A plant's way of getting seeds to a new place

Science - Evolution and Inheritance

Topic Overview

In this topic, we will recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. We will also recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Finally, we will identify how animals and plants are adapted to suit their environment in different ways and that adaption may lead to evolution.

Key Knowledge – Science

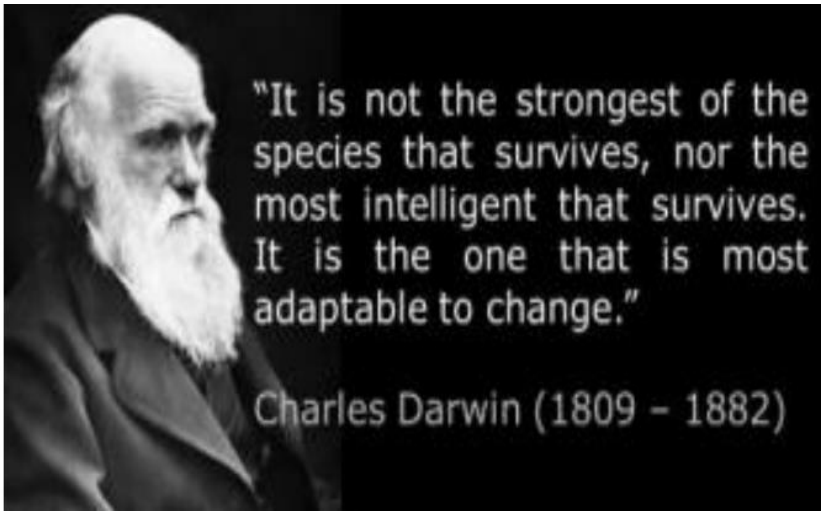
Be able to list physical and behaviour adaptions for animals from different habitats e.g. a shark, polar bear and a camel. Explain how these adaptions help creatures to survive and thrive in their habitat.

Know what a habitat is and list different habitats around the world

Be able to explain evolution and how it can lead to adaption.

Use knowledge of habitats and adaptions to create your own adapted creature for a chosen habitat.

Know how offspring have characteristics of parents but are not identical.



Did you know?

Meerkats have dark circles around their eyes, which act like sunglasses, helping them see even when the sun is shining brightly.

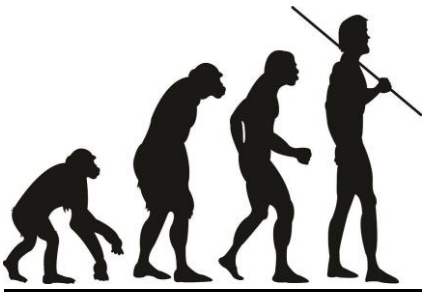
Even when a snake has it eyes closed, it can still see through its eyelids. Why would this be an advantage?

Some animals use camouflage colours to help them blend in with the background and stop predators seeing them. Sometimes predators also use it to avoid being spotted by their prey.

The blue whale can produce the loudest sound of any animal At 188 decibels, the noise can be detected over 800km away Why would they need to do this?

Key Vocabulary

Word	Definition
D.N.A	Deoxyribonucleic Acid – tiny pieces of code that determine our features
Inheritance	Where features or traits are passed down from a previous generation
Adaption	A change or modification that has occurred physically or behaviourally so you can function better in a chosen environment
Habitat	An area something lives in
Species	A specific type or breed of something
Predator	A creature that hunts and eats another creature
Prey	A creature that is hunted and eaten by another creature
Camouflage	Disguising yourself and blending into the surroundings



Science - Earth and Space

Topic Overview

In this topic, we will describe the movement of the Earth, and other planets, relative to the Sun in the solar system. We will describe the movement of the Moon relative to the Earth and describe the Sun, Earth and Moon as approximately spherical bodies and use the idea of the Earth's rotation to explain day and night.

Key Knowledge – Science

Understand the movement of Earth in the solar system.

Know the reasons for day and night

Understand the rotation of the Moon and phases of the moon

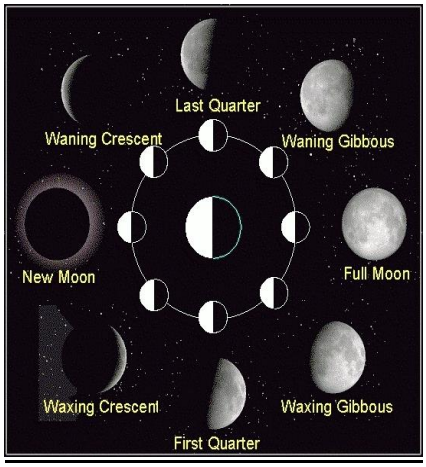
Know the sun moves across the sky and creates shadows

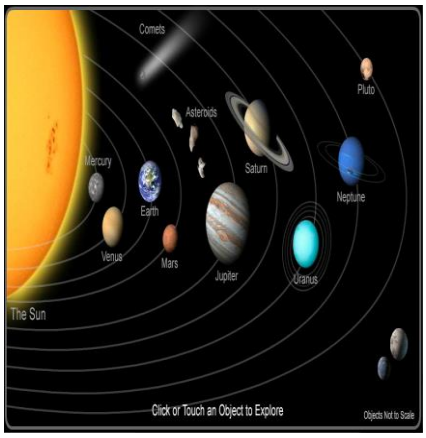
Know more about the planets in the solar system.

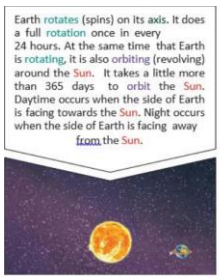
Research space exploration and astronauts including Mae Jemison (first African American Women in space)

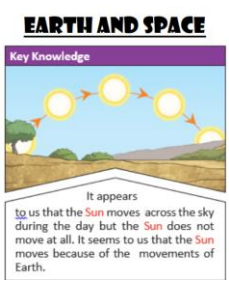
Key Vocabulary

Word	Definition
Solar System	The solar system consists of the sun and everything that orbits, or travels around the Sun
Sun	A huge star that Earth and the other planets in our solar system orbit around
Star	A giant ball of gas held together by its own gravity
Moon	A natural satellite which orbits the earth
Planet	A large object, round or nearly round that orbits a star
Sphere	A round 3D shape in the shape of a ball
Satellite	Any object or body in space that orbits something else, e.g. the moon ais a satellite of the Earth
Orbit	To move in a regular, repeating curve path around another object
Rotate	To spin
Lunar	To do with the moon
Solar	Related to the sun
Stellar	To do with a star









Science - Light (and the eye)

Topic Overview

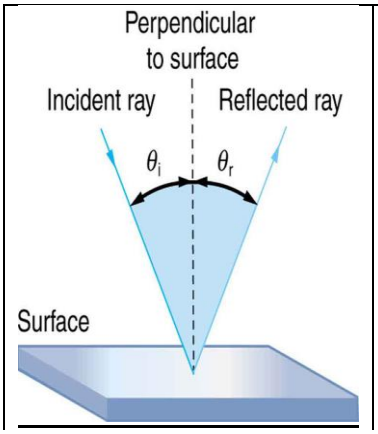
In this topic, we will study how light appears to travel in straight lines. Research reflection and how this links to the eye see when the position of the light source schanges.ng. We will look at how light travels from light sources to our eyes and via other objects and investigate shadows and why they have the same shape as the objects that cast them and predict the size of shadows. Parts of the eye will be identified and their functions discussed.

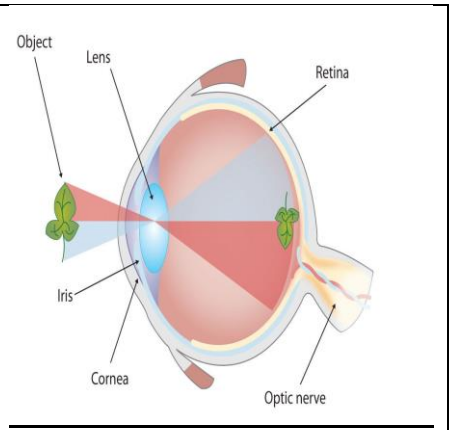
Key Knowledge – Science

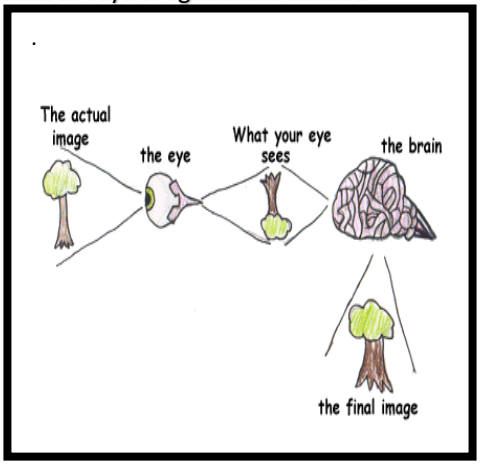
- Understand and be able to label key parts of the eye and explain their function.
- Understand how we see and the journey light goes on through our pupil, to the retina, down the optic nerve and to the brain which processes the image.
- Understand and be able to explain how the eye protects itself.
- Understand that light travels in straight lines and the relationship between shadows and the blocking of light, conducting shadow experiments.
- Understand the terms opaque, transparent and translucent and list materials for each category.
- Understand the process of reflection and refraction.
- Research work of Patricia Bath and her findings on laser treatment on cataracts.

Key Vocabulary

Word	Definition
Eyes	Globular organs of sight in the head of humans and vertebrate animals
Retina	Part of the back of the eye where a picture is printed of what you see.
Pupil	The gap in your eye letting light through
Iris	These contract to control the size of the iris, like a curtain limiting the amount of light into your eye.
Cornea	The clear, protective surface of the front of your eye.
Optic nerve	A nerve sending images to the brain
Lens	Focuses light and makes a clear image
Filter	Pass through a device to remove unwanted material (liquid, gas, light or sound)
Light	The natural agent that stimulates sight and makes things visible
Reflection	The throwing back by a body or surface of light, heat or sound without absorbing it
Refraction	The bending of light as it passes from one substance to another with the bending caused by the difference in density between two substances
Spectrum	, produced by separation of the components of light by their different degrees of refraction
Light source	Something that provides light, whether it be a natural or artifical source of light (e.g. the sun, a torch)
Periscope	An apparatus consisting of a tube of attached to a set of mirrors or prisms through which an observer can see things that are otherwise out of sight
Rainbow	An arch of colours visible in the sky, caused by the refraction and dispersion of the sun's light by rain or other water droplets in the atmosphere
Shadow	A dark area or shape produced by a body coming between rays of light and a surface







Science - Properties of Materials

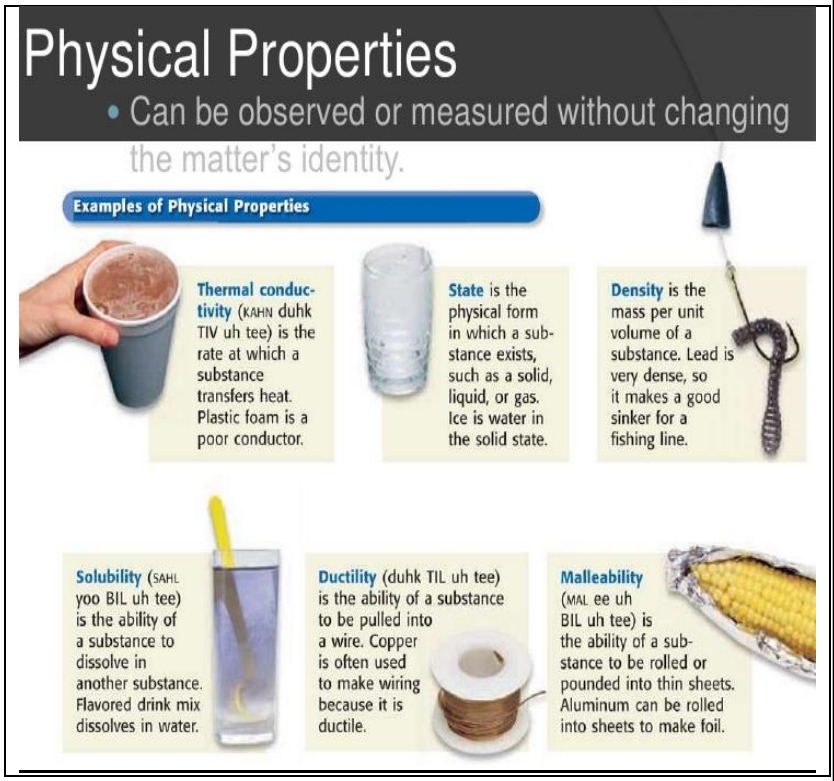
Topic Overview

In this topic, we will use fair tests and evidence to compare and group everyday materials based on their hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets. From this information we can provide evidence based reasons for materials particular use.

Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.

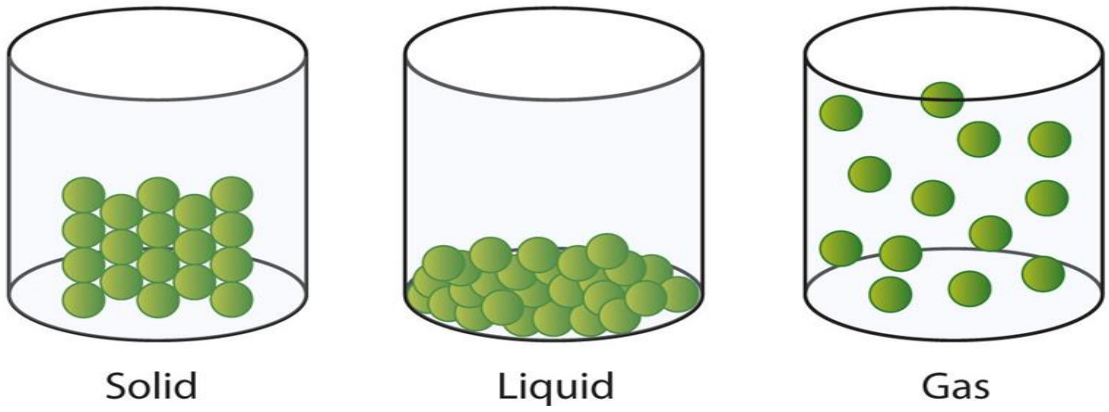
Key Knowledge – Science

- Compare and group materials based on physical attributes
- Give reasons why materials are used for certain tasks
- Know the states of matter and how these can be reversed from one to another



Key Vocabulary

Word	Definition
material	The substance that objects are made of.
Hard	Not easily bent, broken, scratched or pierced.
Transparent	Allows light through and can be seen through
Opaque	Cannot be seen through
Conductor	Allows the transfer of energy (heat or electricity)
Insulator	Reduces or stops the transfer of energy (heat or electricity)
Magnetic	Is attracted towards a magnet
Flexible	Can be bent
Absorbent	Able to soak up water
Solid	A hard object
Liquid	Can be pored
Gas	Free moving substance
Molecules	Make up the composition of a solid, liquid and gas



Science - Reversible & Irreversible Changes (Materials)

Topic Overview

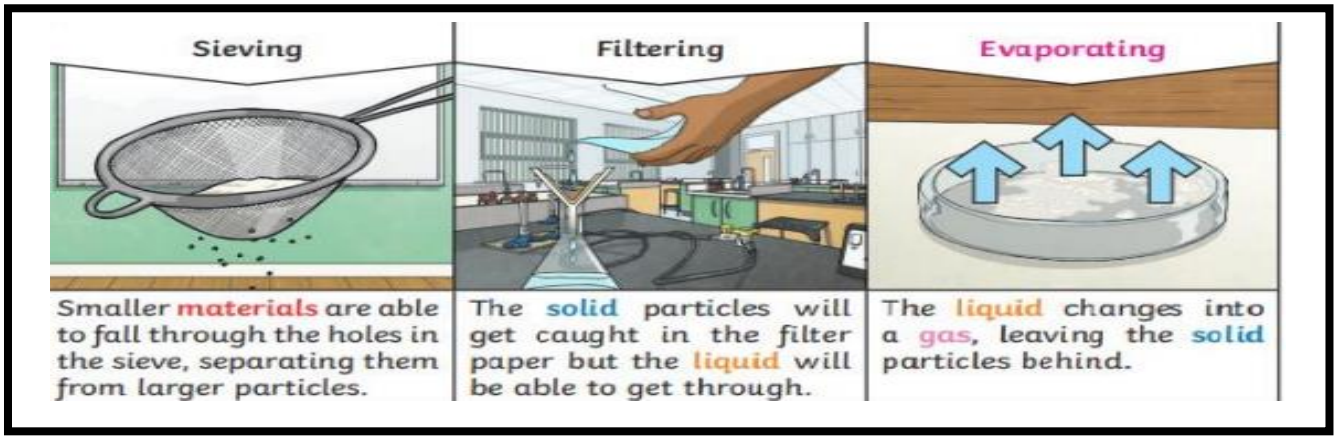
In this topic, we will understand that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.

Demonstrate that dissolving, mixing and changes of state are reversible changes.

Know that some changes can be reversed and some cannot and why.

Key Vocabulary

Word	Definition
Material	The substance that objects are made of
Reversible changes	A change that can be changed back again
Irreversible changes	A change that cannot be changed back
Soluble	Able to be dissolved
Insoluble	Impossible to dissolve
Solution	A liquid with a solid dissolved in it
Dissolve	A solid breaks down into really small pieces in a liquid
Filtering	To remove a small solid from a liquid or gas using a filter
Filter	Paper, a sieve, charcoal or something with small holes in it
Freeze	Turn from a liquid to a solid
Melt	Turn from a solid to a liquid
Evaporate	Turn from a liquid to a gas
Condense	Turn from a gas to a liquid



Key Knowledge – Science

- Use practical methods to reverse a change in state.
- Use sieving, filtering and evaporating to reverse materials changes.
- Know that freezing, melting and boiling can be reversed